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ABSTRACT

In 1989, a study was conducted of the transfer rates achieved by the University of Minnesota's General College (GC) students. In order to collect a body of comparative statistics, a literature review was conducted on the accuracy of transfer rate calculations, national data on transfer rates, variables believed to affect transfer, and indicators used to evaluate the transfer mission of two-year colleges. The literature revealed that: (1) the unreliability of transfer data, due to differences in institutional characteristics and counting procedures, makes it impossible to obtain an aggregated national norm; (2) when total institutional enrollment is used as the potential transfer pool, transfer rates are usually estimated to be between 5% and 15%; however, when potential transfer pools are restricted to full-time freshmen, estimated transfer rates range from 20% to 40%; and (3) student preparation, ability, motivation, and intent to acquire a baccalaureate are believed to have strong and direct effects on transfer. The study of GC transfer rates focused on the personal characteristics, academic performance, retention, and transfer patterns of 1,042 freshman who entered GC in summer or fall 1986. Of the students, 22.2% transferred to another unit within the University by winter 1989. Asian-Americans had the highest transfer rates (36%), followed by Hispanics (26%), Whites (22%), Blacks (15%), and American Indians (12%). Of 1,042 students, 3.3% never completed their first quarter, 6.9% dropped out after their first quarter, 17.8% never enrolled again after the first academic year, and 31.4% were still enrolled at GC in fall 1988. Cumulative grade point average after two quarters was closely related to eventual transfer. A 62-item bibliography is attached. (JMC)

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EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT TRANSFER RATES BUT WERE AFRAID TO ASK

By

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University of Minnesota
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Topical Paper #1

April 24, 1989

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Introduction

Education indicators are numbers (i.e., descriptive statistics such as means, ratios, rates) that are used by decision makers for the purpose of guiding policy decisions. They are also used by institutional researchers and evaluators for purposes of applied research and program evaluation. Transfer rates, or the percent of students from a two-year college who subsequently enroll in a four-year institution, are indicators with considerable influence over public perceptions and policy decisions.

Since the mid-1970s, transfer rates of community college students have been declining in many states (e.g., California, Florida, Washington; see Lombardi, 1979), although recent estimates suggest the downward trend has leveled out (McIntyre, 1987). This perceived decline has led several observers to question the effectiveness of two-year institutions in their transfer mission (Kissler, 1982; Cohen, 1979; Lombardi, 1979). Astin (1977) concluded that students enrolling at a two-year college had a smaller chance of attaining a baccalaureate degree than students starting at residential, four-year institutions, even after controlling for student characteristics (e.g., social background, ability, motivation). Alba and Lavin (1981, p. 235), in comparing open admissions students with regular students at the City University of New York (CUNY), similarly found that "placement at a community rather than a senior college made a difference, albeit modest, in the ultimate educational attainment of students," even when the two samples were matched on ability and other entry characteristics. Whether two-year colleges should be judged on their transfer rates alone, however, or even whether the assessment process is well served by the transfer indicator, is a matter of some debate (McIntyre, 1987; Knoell & Medsker, 1965).

The purpose of this paper is to 1) summarize a recent literature review on transfer rates and 2) present information on the transfer rates of students at General College. Ultimately, General College needs to determine, for itself, the meaning of transfer rates and how

this indicator should be used, or not used, in evaluating program effectiveness. To do so without knowledge of previous data, knowledge of how the indicator is calculated and reported, and knowledge of the indicator's limitations would seem ill-advised. Perhaps the information presented here will help us to better debate the issues.

Method. To use an indicator in educational evaluation, one makes several presumptions: first, that the indicator can be calculated consistently and accurately (Murnane & Raizen, 1988); second, that whatever (numeric) value is obtained can be interpreted in light of previous data, comparable data, or a priori standards (Oakes, 1986; Shavelson, et al., 1987); and third, that the variables believed to affect the indicator are known and can be controlled when estimating the contribution of institutional or program characteristics (Schmitz, unpublished paper, 1989). In essence, these assumptions concern issues of reliability and validity that surround any measure and its resulting numbers.

The Literature Review. In order to test these assumptions, we reviewed the literature on transfer rates with an eye to the following questions:

1. How accurately are transfer rates calculated?

2. What national data on transfer rates are available?

3. What variables are believed to affect transfer rates?

4. What other indicators are used to evaluate the transfer mission of two-year colleges?

Ultimately, we hoped to collect a body of reliable statistics that could function as a norm or standard, which would then help us interpret transfer rates achieved by General College students. Presently, it is difficult to say whether a particular rate is "poor," "good," or "good enough," for a reference point is lacking.

A manual search of **Current Index to Educational Journals** (CIJE) was made under the key words evaluation (methods, criteria, problems), two-year colleges (community colleges, developmental programs, remedial instruction, transfer programs), and two-year college students (high risk, nontraditional). Fifty-six articles published between January 1982 and June 1988 were found and reviewed. To capture earlier studies and reports not published in journals, an ERIC search of CIJE and RIE (**Research in Education**) was conducted for the period 1966-1988 using similar key words. In addition, all articles with "transfer rate" in the title were searched. While ERIC produced 165 titles, only 56 articles concerned transfer rates or issues; others discussed topics such as improving articulation between two- and four-year schools, the history of community colleges, policy debates on open enrollment, and descriptions of students, model programs, and evaluation practices. Additional articles were found from scanning bibliographies. The final list of references (see Appendix) reflects the best and most relevant of the obtainable articles.

GC Transfer Data. Simultaneously, we calculated the transfer rates of students in our GC 1986 cohort. The cohort represents the earliest complete data set ORE has on entering freshmen. It reflects a student population that enrolled in GC before the Base Curriculum went into effect but just as the transfer mission of the College became prominent. As such, it serves as a rough baseline of transfer for our students within the University. We calculated transfer rates for the entire 1986 GC cohort and then separately by ethnic group and eligibility categories (i.e., first-generation college student, physically or learning disabled, low-income). Then we looked for student characteristics (both pre-enrollment and post-enrollment) that would explain differences in transfer rate. Specifically, we looked at gender, minority, disability, residence, first-generation status, family income, family size, high school GPA, first- and second-quarter college GPA, and credits completed.

Our findings are presented below in two sections, reflecting the two investigations, and according to the questions guiding each inquiry. Concluding this report are summary comments that may

help guide future discussions on the use of transfer as an indicator of institutional effectiveness.

Findings from the Literature Review

1. How Accurately Are Transfer Rates Calculated?

> Transfer education is one of the most important, most criticized, and most difficult to measure of the functions performed by community colleges. If the performance of community colleges is to be properly assessed, problems of measuring and analyzing the transfer function must be solved (McIntyre, 1987, p. 142).

Transfer rate is a deceptively simple figure. While it's readily agreed that transfer rate is the ratio of transferred students over the potential number of transfer students, defining who has transferred and who has the potential or intends to transfer are not straightforward tasks (Cohen, 1979; Palmer, 1986). Moreover, the operational procedures used to count students varies from state to state and system to system, making comparison across institutions hazardous.

For example, nationally collected data usually include transfer to nonpublic schools, whereas state collected data tend to focus exclusively on public school transfer (Lombardi, 1979). Not all rates distinguish between "lateral" transfer (which refers to movement between two-year programs), "reverse" transfer (which refers to movement from four-year to two-year schools), and "regular" transfer from community or junior colleges to four-year degree programs. Several researchers report the high incidence of both lateral and reverse transfer (e.g., Mitchell & Grafton, 1985; Adelman, 1988).

Moreover, "transfer students" can refer to students transferring within a University or state university system (or to both) or outside of these systems. Transfer rate may (or may not) include students

enrolling in technical institutes or community colleges. It may refer to all students who are admitted to senior institutions, or only to students who actually enroll in the senior school for a designated period of time (e.g., one quarter, 12 credits). A transfer rate may be based on all students who transfer to a particular senior institution or only those who received a two-year degree before transferring.

Similarly, defining the potential pool of transfer students is difficult, especially for multi-mission colleges serving a variety of student populations. Some potential transfer pools are defined as those students enrolling in a liberal arts rather than a vocational track, although Sheldon (1981) and others (e.g., California State Postsecondary Education Commission, 1979) report the significant incidence of vocational track students eventually transferring to four-year programs and liberal arts students never transferring. Other institutions use students' self-reported "intent to transfer" upon admission as the source of identification. Cohen and Brawer (1981-82) point out that self-reported degree aspirations are not especially reliable, as few students will say they have never thought about, and do not intend to consider, the possibility of transferring to a senior college. Other definitional distinctions include full-time vs. part-time student, first-time freshman vs. freshman with previous postsecondary credits, continuously enrolled vs. intermittent attendee. Each of these delimiters will result in a different transfer rate.

Palmer (1986, p. 105) illustrates how greatly the rates vary depending upon which definitions are used. In California, "if total headcount enrollment [in community colleges] is used, then the transfer rate is 3%. If the number of full-time, college-age students is used, then the transfer rate is 17 percent. If the number of first-time, full-time college-age students is used, the transfer rate jumps to 59 percent. And, if potential transfer students are defined as the number of first-time, full-time students who intend to transfer, then the transfer rate is 71 percent" (California Community Colleges, 1984, p. 14).

Transfer rates also vary depending on the "unit of analysis" or level of grouping the data. When based on a particular entering

class, transfer rate refers to the proportion of the class transferring after a particular period of time (e.g., two years, four years). In this case, transfer rates tend to increase each year out that they're calculated, leveling out after three, five, or more years. In contrast, when the total institutional ("headcount") enrollment is used as the unit of analysis, transfer rate refers to the proportion of students enrolled in a given year who transfer, regardless of when they matriculated. Transfer rates based on cohorts provide one type of longitudinal data; rates based on annual institutional enrollment provide another. Transfer rates based on cohorts tend to be larger than rates based on total headcount enrollment, as the latter ratio reflects a much inflated potential pool of students, many of whom may be long-term, unsuccessful persisters or have no desire to transfer.

In addition to problems of inconsistent definition and reporting, there are serious flaws with some of the methods used to collect transfer data (Cohen, 1979; Palmer, 1986). To start with, all rates are basically estimates. When individual schools do the collection, the event of transfer is typically recorded one of two ways: either by alumni surveys or by requesting annual reports from senior institutions. A persistent problem with alumni surveys is low response rates. Response rates are rarely as high as 50%, and the likelihood of nonresponse bias is strong. When junior institutions request routine data from senior schools, problems with inconsistent definition or reporting may occur, but missing data become an additional threat. Not all senior schools are willing to report data to "feeder" schools, especially if the proportion of transfer students per class is low. Out-of-state transfers are rarely counted. Moreover, whenever students attend intermittently or take time out after completing the A.A. degree before transferring, their records are dropped from most reporting systems (Cohen, 1979).

Most two-year colleges lack the data collection systems needed to carry out comprehensive, systematic reporting of transfer (California Community Colleges, 1979). It comes as no great surprise, therefore, to discover that transfer data gathered at the institutional level are scarce. The more successful attempts at measuring transfer

have occurred when the cooperation of senior institutions has been formalized, e.g., Illinois Community College Board (Bragg, 1982); Richardson and Doucette (1982) in Arizona; Florida State Department of Education (1983); and Doucette and Teeter (1985) in Kansas (see Palmer, 1986). Few state education coordinating or governing boards outside of California have been able to measure the incidence of statewide transfer in any detail.

In Minnesota, for example, the state Higher Education Coordinating Board (HECB) requests that all postsecondary institutions in the state report to them annually the number of new student admits with previous school transcripts. While HECB can tell us the number of students who jump from one institution to another, its breakdowns do not include colleges within the University. For example, 1,163 students left the Twin-Cities campus in 1987 for another post-secondary school in the state (Schoenecher, in conversation and requested data, 1989). How many General College students transferred outside the University, however, is not now known.

While the University of Minnesota can tabulate the number of students transferring to the Twin Cities campus from community colleges and state universities each year, these figures do not result in transfer rates for the two-year schools. For a rough estimate of the number of such transfers, we find in a study by Hendel, Teal, and Benjamin (1984) that 129 (6.94%) of 1857 students sampled from Minnesota area-vocational-technical institutes, community colleges, and state university campuses transferred to the University (Twin Cities campus) during a given year.

Summary. Because of the unreliable nature of transfer data, Cohen (1979) and Palmer (1986), among others (e.g., ERIC Clearinghouse for Junior Colleges, 1984), concluded that we can't really answer the question, "How many students transfer from community colleges to four-year colleges and universities in the United States?" While this position may be extreme, conditions regarding transfer data are sobering. Certainly, it is not possible to aggregate statistics reported in the literature and average them in order to obtain a national "norm." Additionally, great caution must

be applied when examining national studies because the particular sample drawn, the retention of subjects, and time period used in the calculation will all affect the rates. Individual institutions, though, can reliably measure transfer rates and study them within the context of their own systems and compare these rates over time. Regarding external transfer data, however, readers should approach published rates with caution and question how they are calculated before drawing any conclusions.

2. What National Data on Transfer Rates Are Available?

The National Center for Education Statistics (NCES), which is housed in the Office of Educational Research and Improvement (OERI) in the Department of Education, is the nation's repository for any and all statistics pertaining to education, from enrollment figures to annual salaries of faculty to degrees earned. NCES publishes two compendia of data each year: **The Digest of Education Statistics** and **The Condition of Education**. Neither source reports transfer rates from two-year to four-year institutions. The Center has funded large-scale studies, however, on the transfer function of two-year colleges, using national data bases such as the National Longitudinal Study (NLS) of the High School Graduating Class of 1972 and High School and Beyond (HSB): Study of the Graduating Class of 1980. Probably the most comprehensive measure of transfer comes to us from Clifford Adelman (1988), senior associate in OERI. Reporting on the NSL, he found that:

> one out of five individuals who attend two-year colleges* eventually attends a four-year college, irrespective of whether a degree is earned at either type of institution. This is the true "de facto transfer rate." If we define the transfer rate in terms of attainment of the B.A., it drops to 11%. If we define it in terms of Associate's plus Bachelor's, it is only 6% (Adelman, 1988, p. 40).

* Note: "Two-year colleges" included community and junior colleges but not vocational/technical schools, or four-year institutions with A.A. degree programs.

The NLS study sample consisted of 22,600 high school graduates who were tracked annually until 1986. While the data are based on self-report via surveys, the retention rate of this cohort has been fairly impressive, with 12,800 students (57%) still responding after 14 years.

Interestingly, an earlier study of transfer using the same NLS study sample (Peng, 1977) reported a transfer rate of 6.17% after one year for the cohort of 1972 spring graduates who enrolled in a two-year college that fall. These students transferred sometime during or at the end of their first year in the two-year school. After two years, slightly over 24% of the cohort had transferred, while 52% had withdrawn from school and 24% were still enrolled at the community college level. One explanation for the discrepancy in transfer rates reported by Peng (24% after two years) and Adelman (20% after 14) is that Adelman's data were calculated almost ten years later. During that period, conceivably many more 1972 high school graduates decided to try college, but did not succeed in transferring. These "late attempts" were not included in the NLS first and second follow-ups, which constituted Peng's potential transfer pool. It's important to note that when transfer is based on longitudinal studies of cohorts, rates can decrease as well as increase each year out.

Aside from reporting an overall transfer rate of 20%, one of the more relevant findings from Adelman's work is that "four-year colleges award nearly one out of every five Associate's Degrees, yet their 'de facto transfer rate' (in this case, from the lower to upper division), is no better than that of public two-year and private junior colleges" (Adelman, 1988, p. 41). This casts a different light on the prevailing notion that baccalaureate-bound students are better off when they begin two-year programs at four-year institutions. Before disregarding previous research on this question, however, researchers should test this finding locally by comparing rates within a state or geographic region.

A transfer rate of 20% is notably lower than the estimate reported by Holmstrom and Bisconti in a 1974 study supported by the American Council on Education (ACE). Using national,

longitudinal data collected by the Cooperative Institutional Research Program (CIRP) established by Astin, the study focused on 1968 freshmen. Forty-six public and 21 private institutions were included in this analysis. "Of the students who entered junior colleges on a first-time, full-time basis in 1968, slightly more than half (51%) had transferred to a four-year college or university by 1972" (p. 16).

Other estimates have been reported from national studies. Medsker (1960) found that one-third of the regular day students at 63 junior colleges had transferred to the upper division within four years. Karabel (1972) reported that fewer than one-third of community college students transfer to four-year schools. In one of the earliest studies, Eells (1941) found that "the average percentage of transfer from public community colleges was 18%, with a range by region of 17% to 26%, the lowest from California and the highest from the middle states" (see Lombardi, 1979, p. 10).

California transfer data are particularly interesting to look at because currently, the state enrolls one-fourth of the nation's community college students and a strong transfer role for the community colleges was formally expressed in the state's 1960 Master Plan for Higher Education (McIntyre, 1987). Additionally, the state has developed one of the more comprehensive, intra-system data reporting networks in the country, producing much of the published literature on transfer. Even here, however, transfer reports are not entirely consistent.

In 1985, Richardson and Bender reported that fewer than one California community college student in ten completes a two-year degree and subsequently transfers to a four-year institution. When total headcount enrollment is used, transfer rates for California are low: rates fell from 4.8 of all enrolled students in 1973 to 3.6 in 1976. During the same period, using the same calculation procedures, rates from Washington State fell from 3.3 to 2.9, and in Florida they fell from 9.9 to 8.5 (Lombardi, 1979, p. 12). (For California and Florida, transfers included public state universities and four-year colleges; for Washington, transfers included both public and private universities as well as four-year colleges.)

In studying California state data bases over a 22-year period, McIntyre (1987) found that the total **number** of community college transfers to the University of California (UC) and to the California State University system (CSU) peaked in 1975 and declined in eight of the 11 subsequent years. Peak **rates** of transfer occurred in the late 1960s, some seven years earlier than the peak in number. From 1965 to 1986 transfer rates fluctuated from less than 2% to approximately 3% for UC, and from roughly 9% to 13% for CSU. Combining these systems, the transfer rate dropped from a high point of about 15% in 1975, then levelled out around 13%. (These figures are based on *full-time* community college students in the state who enrolled in UC or CSU during a given year, rather than total community college headcount.)

Similarly, Karabel (1986) studied the decline in transfer from community college to USC or UC from 1973 to 1983 and found that annual rates to UC dropped from 2.7 to 1.7 during this period; the rate for students transferring to CSU dropped from 11.1 to 9.7. The percent of minorities (Chicanos and Blacks) from a 1981 cohort who transferred after two years was also given. The two-year transfer rate of Chicanos to UC was 8.9; the percent transferring to CSU was 9.7. The percent of Blacks from the same 1981 cohort transferring after two years to UC was 4.2; the percent transferring to CSU was 6.6. Concern for the California declines in transfer was heightened when the Mexican American Legal Defense and Educational Fund (MALDEF) filed a civil suit in 1983 charging the state with discrimination, observing that "minorities were overrepresented in community colleges, but underrepresented among transfers to UC and CSU" (McIntrye, 1987).

In studying students in 15 California community colleges who said they intended to transfer upon enrollment, Sheldon (1981) found that one-third of the sample transferred after three years; half were still enrolled at the community college. Similar rates were found by Rancho Santiago Community College (1986); after two years, 20% of a transfer cohort transferred, two-fifths were still enrolled, and the remaining students were not enrolled. A more recent update of transfer figures from the California State

Postsecondary Education Commission (CSPEC, 1985) for the years 1982-85 reported a systemwide transfer rate of 35% for all ethnic groups.

These figures are somewhat comparable to figures reported for the first cohort of open-admissions students beginning a transfer program sponsored by City University of New York (CUNY) in 1970 (Alba & Lavin (1981). These researchers found that by the end of the second year, about 45% of their sample had dropped out [of the community college]; by the end of the fifth year, a quarter had transferred. This rate was considered low, as all students were guaranteed a place in the CUNY four-year schools if they completed the associate degree, and the four-year schools were required to accept *all* of the student's lower-division credits. Eventually, however, 40% of the sample transferred.

Summary. Transfer rates vary from study to study and institution to institution, reflecting differences not only in factors such as curricular program, student body, institutional control, and articulation agreements (see section below), but differences in counting procedures as well. When total institutional enrollment is used as the potential transfer pool, rates are usually low for community colleges. Cowen and Brawer's (1981-82) best estimate of the number of students transferring from two- to four-year institutions is about 5% of the total enrollment in any given year. Similarly, "From examination of a total degree credit enrollment, estimates of those who transfer from community colleges to universities range from about 5 to 15%" (Richardson & Bender, 1985). When potential transfer pools are more narrowly defined as freshman cohorts consisting of full-time students intending to transfer (for example), the majority of transfer estimates seem to range from 20% to 40% after two or more years. In one study (Holmstrom & Bisconti, 1974), rates were as high as 51% when full-time students were counted and private colleges constituted a healthy proportion of the sample.

While a national average or norm still eludes us, probably the most useful reference point is Adelman's finding that 20% of the high school graduates who chose a two-year college sometime between

1972 and 1986 eventually transferred to a four-year program. This figure, in essence, "averages out" (and in a sense, controls for) different types of institutions, programs, and students. While this report doesn't provide a breakdown of transfer rates by institution or student population, it tells us something about the nature of students in how they select and persist in post-secondary education. A major limitation is that this reference point is somewhat dated and we can only guess how students entering two-year colleges today differ from those who finished high school in 1972.

3. What Variables Are Believed to Affect Transfer Rates?

Knoell and Medsker (1965) identified three broad classes of variables believed to affect transfer rates: quality of students, quality of lower division preparation offered, and quality of the two-year program's ability to link students with appropriate four-year institutions. The presence of strong articulation agreements and of well-articulated curricula between junior and senior colleges were mentioned by Knoell and Medsker (1965), the California State Postsecondary Education Commission (1985), Turner (1988), and the Ford Foundation's Urban Community College Transfer Opportunities Program (Donovan, et al., 1987). In addition, senior colleges can very directly influence transfer rate by limiting enrollment and raising or lowering admission requirements. For example, limited space in the College of Business Administration was cited by Hartleb (1986) in explaining the "low" (43%) transfer rate of sophomores from the University College Pre-Business Administration to the University of Cincinnati Business School.

Holmstrom and Bisconti (1974) suggested that students' academic plans, high school grades, and institutional control (private vs. public) are moderate predictors of transfer. Similarly, "Having a high [high school] GPA, planning to attain a college degree, and being enrolled in a private college are all associated with higher transfer rates" (see Velez & Javalgi, 1987, p. 82). In analyzing data from the National Longitudinal Survey of the High School Class of 1972, Peng (1977) found that students of higher SES had a greater transfer rate

than lower-SES students; whites transferred at a higher rate than Blacks; and Blacks transferred at a higher rate than Hispanics. Students' high school preparation (i.e., enrolled in academic track) also had an effect. Lombardi (1979) also reported that high school major influenced the probability of transfer: in a study of 523 students who transferred from three different two-year colleges, 75% had had strong academic (rather than vocational) majors in high school (Blocker, et al., 1965).

In attempting to explain the decline in transfer rates seen in California, Cohen (1983) mentioned two factors: 1) decline in student preparation in high school and 2) lack of tuition in California (which, he felt, promoted "casual" attendance patterns). Other studies have found that full-timers and students who enroll for consecutive semesters are more likely to transfer than part-timers and intermittent attendees (Florida State Department of Education, 1983; California State Postsecondary Education Commission, 1979).

The decline in transfer rates suggests that either students, programs, or external conditions (or some combination of the above) have changed. Friedlander (1980) and Lombardi (1979) reported significant decline since the early 1960s in student intentions to transfer and interest in obtaining a baccalaureate. In 1980, roughly 30% of the students in junior colleges were transfer-oriented, whereas three decades earlier, the figure ranged between 60% and 70% (Lombardi, 1979). Friedlander also found significant increase in specific occupational programs being offered in junior colleges and proliferation of remedial and adult basic education courses. Decline of what Willingham (1972) terms the "traditional" transfer mission of community and junior colleges and subsequent expansion of adult, vocational, and continuing education are well summarized by Kissler (1982) and Lombardi (1979).

As mentioned, transfer rates vary depending on the types of institutions involved (community vs. private junior college; public vs. private four-year institution). The much lower rate of transfer from California community colleges to the University of California than to the California State University system reflects substantial differences in these receiving schools' admission requirements. When ten

private, independent junior colleges were studied by Schachter (1986), transfer rates ranged from 35% to 98%, with an average of 74%. Most of these colleges had strong liberal arts, transfer-oriented core curricula. In addition, "transfer arrangements and development of articulation agreements were found to be of central concern" (p. 134). Presumably, private junior colleges also enroll a student population that enjoys certain advantages (e.g., financial capability, academic preparation, family support).

Additional factors are believed to affect transfer rates for minority students. In Turner's (1988) comparative case study of three community colleges in California, "tokenism" or the condition where a single minority group is greatly outnumbered, was associated with highly discrepent transfer rates. Turner found that in a college where a high transfer ethic was communicated and high transfer rates (39% Whites, 34% Hispanics) were achieved, the student body was racially mixed; Hispanics comprised 17% of the school, other non-White students comprised 36%, and White students 30%. In a college with a low transfer ethic that achieved low transfer rates across the board (18% Whites, 11% Hispanics), the student body still fairly equivalent, proportionally speaking. In the college where discrepant rates were observed, Hispanics comprised only 8%, other non-Whites 6%, and White students 85% of the student body. While this latter college emphasized transfer and provided linkages, none of the interventions were specifically targeted for the Hispanics. Turner concluded that Whites identified with the transfer ethic and the discrepant rates (43% Whites, 19% Hispanics) resulted.

Probably the best attempt to isolate factors affecting transfer rates was conducted by McIntyre (1987). Using full-time freshman enrollment in California community colleges as the potential transfer pool, McIntyre ran a multiple regression analysis on 22 years of transfer data to UC and CSU. Twelve independent variables were used in the analysis, including: number of high school graduates three years prior to transfer; level of unemployment two years prior to transfer; the military draft (a dummy variable valued at 1 through 1972 and 0 thereafter); California personal income per capita; average total verbal and mathematics score of California high school

seniors taking the SAT; the cost of community colleges (fees, transportation, books, supplies, housing) three years prior to transfer; similarly, the tuition and living expenses of UC and of CSU; University upper division admission policy experiment (a dummy variable valued at 1 for the years 1973 through 1976 and 0 otherwise); CSU freshman admissions quota (another dummy variable for years in which CSU used quotas); availability of financial aid; institutional expenditures-per-student at the community college; and special counseling and assessment features at the community college level (another dummy variable coded as 0 or 1, depending on whether schools reported such efforts).

Based on his results, McIntyre argued that the decline in transfer rates in California should not be attributed to deterioration in transfer programs but to factors external to community colleges. For example, the military draft affected both absolute volume of transfer as well as transfer rates; apparently, it encouraged more young men to go to college and to stay in school as long as possible. Upper division admissions requirements of UC and freshman quotas at CSU both had a direct, significant impact on the number and rate of student transfers. Unemployment and tightening labor markets had the effect of keeping more students in school, but did not affect the rate of transfer.

Several factors were inconclusive. For example, student financial capability had no perceptible impact on transfer. Effects of student ability (as measured by SAT scores of graduating high school seniors) were mixed, probably due to the low percentage of community college students taking the test. Expenditures-per-student, which was selected as a proxy indicator for curriculum quality at the community college, was not statistically significant. No significant findings occurred with special efforts to improve transfer counseling and articulation, probably because only a very rough measure of these efforts could be devised for the analysis.

Interestingly, transfer rates tended to be negatively related to the number of high school graduates and the number of full-time community college students enrolled; as the number of high school graduates and full-time community college students increased, the

transfer rate declined. This finding makes sense if the vocational and continuing or adult education "tracks" brought in the additional students, rather than the academic, "transfer" tracks, as is generally believed. In general, the negative correlation supports the principle of selectivity on transfer: the more selective the institution is, or the more "self-selective" (transfer-oriented) the student population is, the higher the transfer rate.

McIntyre concluded that "when the impact of the military draft, lowered University of California admissions criteria, and California State University quotas (all of which took place between 1965 and 1976) is taken into account, it appears that California community colleges have transferred students in a remarkably consistent fashion" (McIntyre, 1987, p. 157). In fact, these variables explained about four-fifths of the variation in transfer rate.

Summary. Student preparation, ability, motivation, and intent to acquire a baccalaureate are variables believed to have strong direct effects on transfer. Also capable of influencing transfer rates are institutional barriers (e.g., high admissions requirements of receiving schools, lack of articulation agreements, irrelevant or weak curricula) and what Turner (1988) calls "transfer linkages" (e.g., articulation officers) and "student linkages" (e.g., on-campus jobs, student clubs, and training in how to effectively use community college resources). Less well understood are the effects of societal influences on transfer (e.g., the military draft, economic forces).

The perspective that transfer rates are affected by a cluster of variables is well summarized by Lombardi (1979, p. 14). After an extensive study of transfer rates from the early 1920s to mid-1970s for the National Institute of Education (DHEW), Lombardi projected the following for the coming decade:

> The low percentage of transfer will be in states that have given jurisdiction of adult and vocational education to the community colleges; have a very high proportion of part-time and older students; have a low selective admission policy; and have a high minority population. The high transfer percentages will come from states and colleges that have students from high

income families, that maintain some matriculation requirements, and that are close to public senior institutions.

4. What Other Indicators Are Used to Evaluate the Transfer Mission of Two-Year Colleges?

While institutions do have some control over transfer (e.g., more selective admissions; student assessment and advising; carefully designed, academic curricula; small teacher/student ratios; articulation agreements with receiving colleges; retention efforts targeted to high risk students), community college educators in the past have tended to "take the position, openly or implied, that in an Open Door college the number [of transfers] will be small; were it otherwise, the commitment to the Open Door might be less than wholehearted" (Lombardi, 1979, p. 8).

This raises the question of whether transfer rates are valid indicators of the transfer mission. Cohen and Brawer ask:

> Are student attrition and transfer rates still valid issues? To those who see access as the colleges' chief contribution to American education, questions of attrition and program completion are irrelevant. But the questions will not go away. They should be answered if only for the sake of the policy makers who shape both the curriculum and the student body even as they remain unaware of their effects (1981-82, p. 21).

Lombardi (1979, p. 8) states that "most educators agree with Cosand that [community and junior] colleges were, are, and will be evaluated to a major degree upon the success of their transfer students to the four-year colleges and universities." One thing that makes judging transfer rates difficult is the lack of a norm or understanding of what an optimum or acceptable percentage of transfer students might be (Lombardi, 1979; ERIC Clearinghouse for Junior Colleges, 1984). Because transfer rates tend to be inconsistent (unreliable) and difficult to interpret, researchers have looked for other criteria to judge the success of transfer programs.

In their landmark study of junior college students post-transfer, Knoell and Medsker asserted that academic performance and graduation rates of transfer students compared to "native" students in the upper division is the ultimate test of the junior college's transfer program.

> If two-year colleges do not prepare students to achieve their baccalaureate degree goals at some acceptable level of performance, the effectiveness of the entire subsystem will be seriously open to question. Student performance post-transfer may be thought of as a more critical test of the subsystem than the mere flow of students through junior college into four-year institutions, since transfer is relatively pointless if students have a low probability of succeeding in the upper division (1965, p. 4).

Palmer, in summarizing an ERIC review of criteria used to assess quality in community colleges, writes:

> Quality is discussed in terms of the rigor in which open-door colleges screen applicants and adhere to academic standards. Much recent literature, including Baradat (1981), Cohen (1981), Excellence and the Open Door (1979), and Koltai (1981) reiterates the need to screen students and to assist those who need remediation. These writers carefully eschew the cooling-out function and stress the importance of tracking systems that will, in fact, lead to matriculation in the transfer program and eventual attainment of the baccalaureate (1983-84, p. 56).

Young (1982) argues that in order to defend the transfer function, community colleges must demonstrate that the "academic performance of their transfer students (a) has not deteriorated historically, and (b) does not differ significantly from that of students who spend their first two years of college at a senior institution." By this line of argument, transfer rates may be unavoidably low if calculated as the percent of all open-admissions students. But, the performance of students post-transfer attests to the ability of two-year programs to 1) identify students with potential, 2) provide academically rigorous and appropriate curricular content, 3) guide

them in their choice of four-year institution, and 4) support their transition from two-year to four-year status.

What variables are believed to affect performance of students post-transfer? The literature is voluminous on this point. Many studies have compared transfer students with "native" students on grade point averages, credits completed, attrition rates, probation rates, graduation rates, and years taken to complete a degree (see Palmer, 1982). While results are mixed, studies showing no difference between transfer and native students tend to be those which controlled statistically for initial student differences in ability (e.g., Richardson & Doucette, 1982; Smart & Ethington, 1985; Stark & Bateman, 1981; Graham & Dallam, 1986; Nickens, 1972; Fernandez, Raab, & Baldwin, 1981; Harmon & Morrison, 1977; Phlegar, Andrew, & McLaughlin, 1978; Holahan, Green & Kelley, 1983).

The majority of studies, however, found absolute differences in academic achievement between transfer and native students. The better longitudinal studies reviewed by Palmer (1986) indicated that "overall, persistence and graduation rates for community college transfer students are lower than the persistence and graduation rates of native university students." Additionally, Graham and Dallam (1986) found that transfer students were more likely to be on probation the first year after transfer than native students in their junior year. Cohen and Brawer (1981-82) reported that a high percentage of transfer students (i.e., 30%) drop out of college during their junior year.

When a community college transfer student does graduate, it generally takes an average of one-and-a-half years longer than it does for the native student. Richardson and Bender (1985) compared the length of time it took "regular" students to graduate from the City University of New York (CUNY) with the open admissions students. Thirty-four percent of the regular students had graduated (with a baccalaureate) after four years; 53% graduated after five years, and 62% after "longer" periods. In contrast, only 16% of the open admissions students graduated with a baccalaureate after four years; 32% graduated after five years, and 43% after 11 years. Kissler (1982) compared California community college

transfer students with native students at California State University and found that the latter group had a higher graduation rate than transfer students (50% vs. 34%, respectively).

In another study (Kissler, Lara, & Cardinal, 1981), native University of California students in their junior year were matched with transfer students from the California State University system and from community colleges (students were matched based on their lower-division grades). Comparisons for each matched group showed that UC native students received higher upper-division GPAs, were less likely to be on probation, and had lower attrition rates and higher graduation rates than their transfer cohorts. Many studies (e.g., Knoell & Medsker, 1965) indicate that "transfer shock," or the tendency of transfer students' GPAs to dip after transfer, then slowly rise, is a fairly predictable phenomenon. The magnitude of the dip depends, it is conjectured, on the difference in grading standards at the two institutions and the size and type of receiving institution, among other factors. Kissler concluded that there was a real decline in the transfer performance of students in California in the decade 1972-82. Reasons for the decline were "associated with differences in the levels of ability and motivation of the students" as well as differences in types of institutions, different levels of competition and grading policies in the junior and senior schools, curriculum and pedagogy, and problems of social integration, particularly for older students.

Given the predilection of research to study individual (ability) differences in students and the predominance of quantitative studies generally in the literature, it comes as no great surprise that the "best predictor" of success at the senior college is the student's junior college GPA. Young (1982) found that ACT scores added a small amount of predictability, as did number of credits accumulated, attainment of the A.A. degree, and junior vs. freshman standing. All of these variables together were less predictive of upper-division achievement, however, than GPA alone. Phlegar, et al. (1981) reported that "community college attended was fourth in predictive importance behind community college GPA, community college math

and English programs, and number of community college hours transferred to senior institution."

Some of the more interesting findings pertain to the optimal amount of time students should spend at the junior institution before transferring. "Attrition in the group which was granted only sophomore standing was 45% compared with only 26% in the group of junior level transfers" (Knoell & Medsker, 1965, p. 37). Similarly, Kissler (1982) found that students who transferred later in their programs, who had completed necessary prerequisites, and who had performed well at the initial instruction were more likely to achieve academically after transferring. Lavin, Murtha, and Kaufman (1984) concluded that the longer the students spend in a community college before transfer, the better these students perform post-transfer. Similarly, "Length of preparation at an Arizona community college was a significant positive factor in the performance of community college transfers at the state's universities" (Richardson & Doucette, 1982, p. 13). The graduation rate in this study of Arizona community college students who transferred after one year was 25%, compared with 42% of students who transferred after two years and a 45% graduation rate for native university students. Data from Illinois summarized by Palmer (1986) similarly found that students with an A.A. or at least two years of study at the community college performed better at the senior institution than those who did not.

Knoell and Medsker (1965) also found that the performance of students post-transfer depended considerably on the types of institutions to which they transferred. For example, "transfer students in the ten teachers colleges achieved the highest rate of graduation (73%) and the lowest rate of attrition (21%). The poorest performance record was earned by the students who transferred to the three technical institutions and to the eight private universities" (p. 45). Characteristics of institutions that these authors believe influence post-transfer performance include: rigor of community college classroom; magnitude of difference in grading standards between institutions; norm groups at both institutions; size and complexity of college; and type of institution. "Transfer students in the large universities tended to earn lower grades than those who

entered small institutions, some of which resembled junior colleges. In the large public institutions in particular, less value may be placed on undergraduate instruction than on research and graduate programs, with the result that the transfer students sometimes lose interest or lack motivation to do their best work." Another factor mentioned is range of majors offered at the junior college level. In many schools, preparation for majors is uneven, with students being generally better prepared in the liberal arts or "soft" subjects, and less prepared for majors requiring math and science.

Low attrition and high graduation rates at Pennsylvania State University were attributed to positive articulation (Knoell & Medsker, 1965). Most of the transfer students began their college career on one of the Commonwealth campuses in the university. "Articulation between the Commonwealth and main campuses was close in such matters as standards for freshman admission, grading, programs, and other facets of curriculum and instruction" (p. 53).

Summary. Because much of the summarized research on post-transfer performance, attrition, and graduation focuses on student variables (i.e., measures of student ability, progress), conclusions regarding the heavy effects of student ability can be a bit self-serving. Rarely are individual differences examined in controlled contexts with different institutional "treatments" or "conditions." It's relatively difficult for institutions to manipulate and control institutional variables (such as student populations and transfer requirements) experimentally, whereas it's relatively easy to run correlations and multiple regression statistics on quantitative indices of student characteristics. More comparative case studies, such as those by Turner (1988) and Palmer (1988) are needed to understand the effects of specific institutional interventions. More studies such as that by McIntyre (1987), which combine ability variables with institutional and societal variables, should be pursued.

In the final analysis, however, student variables will affect transfer rates. Some of these variables, such as the condition of students' home lives or innate drive, are beyond the reach of education's best efforts. Still, the challenge to two-year programs lies in developing optimal conditions for transfer and in

experimenting with curricular and advising interventions to improve not only the transfer rate of able students (i.e., those who persist beyond the first quarter in good standing), but of the performance of these students post-transfer.

Findings from the General College Data Base

To better understand the incidence of transfer from the General College, we studied the background characteristics, academic performance, retention, and transfer patterns of freshman students entering the College in summer or fall of 1986. The 1986 freshman cohort was chosen for several reasons. First, reliable and nearly complete information on this group was available. Second, 1986 marked a turning point in the College's mission; in January, the Regents eliminated baccalaureate and associate in arts degrees. Freshmen entering the College in summer or fall, 1986, would have been more likely to enroll with intentions of transferring than previous cohorts. Third, because the Base Curriculum was not in place that year 1986 cohort serves as an excellent comparison group for future cohorts.

Our investigation was guided by three questions:

1. What is the transfer rate of 1986 students from General College to other units within the University?

2. Can transfer and retention patterns be predicted from pre- or post-enrollment information on students?

3. What is the relationship between academic performance in the General College and likelihood of transfer?

Several statistical approaches were used to address the above questions. In addition to simple frequency distributions, cross-tabulations were used to identify relationships between transfer or retention patterns and variables such as ethnic background and

academic performance. A third technique, called discriminant analysis, was used to address the question of transfer and retention pattern prediction. Academic, retention, and transfer data were obtained for all eight quarters captured in the design (i.e., fall, '86 through winter, '89). This time frame represents all the data we presently can obtain on students. Additionally, eight quarters represents a sufficient time for even part-time students to complete the requisite number of transferable credits.

1. Transfer from the General College

There were 1042 students who registered for the first time at the University of Minnesota in the General College in either the summer or fall of 1986. Of the 1042 students, 231 (22.2%) transferred to another unit within the University by winter, 1989. Table 1 (see Appendix) presents the number of students from the cohort who transferred during each of the eight quarters. Note that few students transferred within the first year. Most transfers occurred either in fall, 1987 or fall, 1988. A surprisingly high number of students transferred *after* the second year; 103 students (45% of all 1986 transfers to date) transferred during the seventh or eighth quarter post-matriculation.

Table 2 indicates the units to which students transferred and the number of students who transferred to each unit. The College of Liberal Arts (CLA) absorbed the majority of GC transfers (71%), followed by the College of Home Economics (14%).

Tables 3 through 6 present cross-tabulations of transfer by various pre-enrollment characteristics (i.e., ethnic background, income level, first-generation college, and disability). Table 3 displays rate of transfer by ethnic background. Asian Americans had somewhat higher rates (36%) than Hispanics (26%) or Caucasians (22%). Blacks and American Indians were at the low end of the spectrum, with 15% and 12% transfer rates, respectively. Caucasians were right in the middle of the distribution. Twenty percent of the international students transferred.

For just over 800 students, information on family income level, disability status, and first-generation college status was available. These data come to us from the Eligibility Form, which the Special Services / TRIO program uses to decide who is eligible for the TRIO. Our 1986 cohort was divided into categories based on the three categories mentioned above.

As can be seen from Table 4 and Table 5, there were essentially no differences in transfer rates for low income (27%) versus non-low income (22%) students, or for first-generation (23%) versus not first-generation (24%) students. Table 6 presents transfer rates for disabled and non-disabled students. Here, there does appear to be a difference, with 15% of disabled students transferring compared to 24% of non-disabled students. This finding should be accepted cautiously, however, given the low number of people in the disabled category.

2. Retention Patterns in General College

The data collected on the fall, 1986 cohort allow us to go beyond simply calculating transfer rates. Our second question asks whether or not retention patterns can be predicted by pre- or post-enrollment student variables. Our third question asks about the relationship between students' academic performance in General College and their performance in their transfer unit or last unit of registration. The results of several statistical analyses which explore these questions are presented in the following sections.

In order to pursue these questions, categories of retention patterns were constructed based on the 1986 cohort data. As Table 7 shows, of the 1042 students, 34 (3.3%) never completed their first quarter, 72 (6.9%) dropped out after completing their first quarter, 181 (17.8%) never enrolled again past the first academic year, 205 (20.2%) did not enroll after the 1987-88 academic year, and 319 (31.4%) were still enrolled in the General College as of fall, 1988. The number of students who had transferred *and remained registered in another unit* by winter, 1989, was 205 (20.2%). Owing to the low number of students who never completed the first quarter, the first

two categories in Table 7 were combined to form a single category of "dropping out during or after the first quarter." The five possible retention patterns were thus defined as follows:

Pattern 1: Dropped out during or after the first quarter
Pattern 2: Dropped out after 1 year (no enrollment after 1986-87)
Pattern 3: Dropped out after 2 years (no enrollment after 1987-88)
Pattern 4: Continued in GC 1988-89
Pattern 5: Transferred (and still enrolled) as of 1988-89

A statistical technique called discriminant analysis was used to combine pre- and post-entry characteristics into mathematical functions that could be used to predict group membership. Discriminant analysis is a multivariate statistical approach which defines central points for groups or categories within a multi-dimensional space. Linear equations which weight each independent variable and combine them into coordinates are used to place each subject within the multi-dimensional space. Then a decision of group membership is made by finding the central group point nearest to a student's point. Discriminant analysis typically produces the best results in terms of reliability and hit-rate when only two groups are to be classified.

A hit-rate is defined as the percent of subjects placed into their correct categories. In evaluating the usefulness of a discriminant analysis, we usually want to decide if the hit-rate is any better than placement by chance. Another concern is whether a high percentage of certain critical groups (e.g., students who transfer) are correctly identified. For example, if there are four classifications, then the chance level is set at 25% by assuming a student has an equal chance of ending up in any one of the categories. If 30% of the students are correctly classified by the discriminant analysis (i.e., the overall hit-rate is 30% correct), we have not done much better than chance. Now, consider a correct placement of 50% of the students for the four group situation. This would indicate that the discriminant analysis

places students at a rate much better than chance. However, this rate would not be practically significant in many situations, especially if we are talking about rejecting half of the people who would have succeeded.

The set of pre-entry variables used consisted of sex, minority (white or nonwhite), whether or not the student had a disability, residence (on-campus, off-campus), whether or not a student was a first-generation college student, family income, family size, and high school GPA. There were 675 students (65%) who provided information on all the pre-entry variables. Comparison of the 675 students to the entire cohort on each pre-entry variable did not produce significant statistical differences, so it appears that the sample is representative. Stevens (1986) recommends a minimum ratio of 20 subjects per independent variable in order to obtain reliable results in a discriminant analysis. The ratio here is about 84 to 1, which is more than adequate. The post-entry variables we used were first- and second-quarter GPA, first- and second-quarter cumulative credits completed, and last-quarter GPA and cumulative credits.

Table 8 summarizes 12 discriminant analyses that were done for the purpose of investigating the utility of pre- and post-enrollment variables in predicting retention patterns (including transfer) of GC students. The text which follows describes for each analysis: how the five retention patterns were combined; which predictor variables were identified; the strength of the canonical correlations; and the individual group and overall hit rates. The first four discriminant analyses used pre-entry variables only to predict group membership. Analyses five through twelve used a combination of pre- and post-enrollment variables to predict group membership.

Predicting Retention Patterns with Pre-Enrollment Information. The question of interest here is whether information collected before a student enrolls in the General College can be used to reliably predict the student's retention pattern. Analysis #1 (see Table 8) attempted to predict student membership in one of four retention patterns: Dropped Out After (or During) 1986-87 (students from

Patterns 1 and 2 were combined for this analysis), Dropped Out After 1987-88, Continued in GC 1988-89, and Transferred by 1988-89. The first function was represented by high school GPA with a canonical correlation of .223 and represents 57% of the explained variance. The second function had the highest loading on family size with a canonical correlation of .164, which represents an additional 30% of the explained variance. The final function had the high loadings on first-generation college status and residence with a canonical correlation of .108 and represents the remaining 13% of the explained variance.

These findings indicate that most of the variation in retention patterns that could be accounted for was represented by the first two functions: high school GPA and family size. Very little was added by knowing whether or not a student was first-generation or living on campus. When the functions were used to predict group membership, the hit-rate was lowest for the Dropped Out After 1987-88 group (20%) and largest for the Transferred by 1988-89 group (45%). Overall, the hit-rate was only 34.0%. In other words, this discriminant analysis did not predit a student's retention pattern very accurately.

Analysis #2 combined students in Patterns 1, 2, and 3 to form a single Dropped Out Within Two Years group and predicted placement in this group or in Patterns 4 or 5 (Continued in GC vs. Transferred). Two functions were defined. The first function was defined by high school GPA (canonical correlation = .202, 62% of the explained variance). The second function was defined by family size, first-generation status, and residence, with the highest loading on family size (canonical correlation = .162, 38% of the explained variance). The respective hit-rates were 40% for Drop-Outs, 39% for Continued in GC 1988-89, and 52% for Transferred by 1988-89, with an overall rate of 42.1%. Again, this is not a very satisfactory result.

Analysis #3 divided the entire cohort into Drop-Outs and Persisters (i.e., all those enrolled at the University in fall, 1988, or winter, 1989). The single function consisted of a linear combination of high school GPA, first-generation status, and family size (canonical correlation = .193). High school GPA had the highest loading. This

analysis produced hit-rates of 54% correct for Drop-Outs and 59% correct for Persisters, with an overall hit-rate of 57.0%. Although this is a marked improvement over the first two analyses, 43% of the students would be penalized by an incorrect decision if the discriminant functions were used for admissions decisions.

The fourth analysis classified students as either having transferred or not having transferred. The single function combined high school GPA and residence, with the highest loading on high-school GPA (canonical correlation = .192). Fifty-nine percent of the non-transfers and 65% of the transfer students were correctly classified, with an overall hit-rate of 60.3%. Again, these are not very impressive results and indicate the unreliability of the pre-entry variables when trying to predict retention patterns among applicants prior to enrollment.

Post-Enrollment Prediction of Retention Patterns. An alternative to predicting retention patterns prior to entry is to look at post-entry student performance. This might be useful if the College wishes to identify "outlying" groups of students, such as those with highest chances of dropping out or transferring, in order to target them for special interventions. Collecting college academic performance information requires that students complete at least one quarter of college work. Because Pattern 1 students never returned to GC after the first quarter, they were eliminated from the analysis. This left only four patterns to predict.

Discriminant analysis #5 used the pre-entry characteristics described above plus first-quarter GPA and credits completed as predictor variables to classify students into Patterns 2, 3, 4, or 5. The best hit-rate was produced by a subset of the predictor variables which included high school GPA, first-quarter GPA, and first-quarter credits completed. Three functions were defined. The first function was best represented by first-quarter GPA and had a canonical correlation of .351 (88% of explained variance). The second function was best represented by credits completed, with a canonical correlation of .128 (10% of explained variance). The third function was represented by high school GPA, which accounted for only 2% of the explained variance (canonical correlation = .055). Therefore,

most of the variance among the four groups seems best accounted for by first-quarter GPA. The rates of correct placement were 43% for Dropped Out After 1986-87; 21% for Dropped Out After 1987-88; 30% for Returned to GC 1988-89; and 66% for Transferred by 1988-89. The overall hit-rate was 38.4%, which represents an uncomfortably high probability of misclassifying drop-outs and students who remain in GC after two years.

The sixth discriminant analysis combined Pattern 2 and 3 students into a single Dropped Out Between Winter of 1987 and Spring of 1988 category for comparison with students who Continued in GC during the third year and those who had Transferred by (and remained enrolled during) the 1988-89 academic year. Two functions were defined. The first function consisted of first-quarter GPA and high school GPA, with the highest loading on first-quarter GPA (canonical correlation = .392, 95% of the explained variance). The second function accounted for only 5% of the variance, and was represented by first-quarter credits completed (canonical correlation = .101). The classification rate is fairly good for students in the Transferred by 1988-89 group (66%), but still low for the Dropped Out group and for students who Returned to GC (48% and 35%, respectively). The overall hit-rate was 47.3%, which leaves considerable room for improvement.

The seventh analysis combined Patterns 4 and 5 into a single Persisters category for comparison with the Dropped Out group. A single function was defined which was best represented by first-quarter GPA and included first-generation status and family income (canonical correlation = .330). Although there is some ability to discriminate persisters from drop-outs, the hit-rate for the drop-outs is near chance (56%). The overall hit-rate is 62.2%. It should be noted that a single function defined by first-quarter GPA alone predicted group membership as well as the above function (canonical correlation = .288, overall hit-rate = 62.2%). Therefore, the pre-entry variables are not making a significant contribution.

At this point, we decided to look at how well the retention patterns for second-year students might be predicted by second-quarter statistics (analysis #8). By fall of 1987, approximately 28%

of the initial 1986 cohort had dropped out. This left three retention groups to predict: Patterns 3, 4, and 5. The discriminant analysis replaced first-quarter GPA and cumulative credits with the same variables based on cumulative information after two quarters. All students who transferred before fall, 1987 were excluded from this analysis.

Two functions were defined. The first was dominated by second-quarter GPA and included disability (canonical correlation = .467, 91% of explained variance). The second function was best represented by first-generation status and included second-quarter cumulative credits, residence, and family income (canonical correlation = .165, 9% of explained variance). The hit-rates were as follows: 47% for Dropped Out After 1987-88; 35% for Continued in GC 1988-89; and 63% for Transferred by 1988-89. The overall hit-rate was 46.2%, again reflecting the difficulty of correctly discriminating between drop-outs and students who remain in GC after two years on the basis of either academic or pre-entry characteristics.

A different story is revealed, however, when the Dropped Out After 1987-88 group (Pattern 3) is merged with the Continued in GC 1988-89 group (Pattern 4) and contrasted with Transferred by 1988-89 students (see analysis #9). (We refer to the Patterns 3 and 4 students as the "Last in GC Fall '87 - Winter '89" group.) The single function defined by the analysis is dominated by second-quarter cumulative GPA, with a moderate loading on second-quarter cumulative credits and low loadings on family size, residence, and gender (canonical correlation = .406). In addition to the overall results shown in Table 8, Table 9 shows that the hit-rates for the Continued in GC and Transferred by 1988-89 groups were 71% and 69%, respectively. The overall hit-rate was 70.1%, reflecting a fairly strong ability to discriminate between students who will transfer and those who won't, based on two quarters of academic work and enrollment during the second year.

Table 10 reports the classification results for discriminant analysis #10, in which the Last in GC and Transferred by 1988-89 groups defined above were studied, but using post-entry variables only. The single function defined was represented by second-

quarter GPA and cumulative credits. The canonical correlation was .398 for this function. The hit-rate for Continued in GC was 70%; for Transfers it was 66%. The overall hit-rate was 69.0%. Note that these statistics are almost identical to those for the functions described above, which included pre-entry information.

Transfers Versus Non-Transfers. The last two discriminant analyses were performed to determine if students who returned to General College in 1988-89 could be predictably distinguished from students who had transferred. Pre-entry variables formed part of the discriminant variable set. In addition, cumulative GPA and cumulative credits completed for students' second quarter of enrollment in GC were used as variables. Therefore, the analysis looked to discriminate between Pattern 4 and Pattern 5 students. All students who transferred before completing two quarters in GC were excluded from the analysis.

The best hit-rate was produced by a function which included only second-quarter cumulative GPA and cumulative credits completed. The highest loading was for second-quarter GPA with a low negative loading on cumulative credits completed by the end of the second quarter (canonical correlation = .456). Table 11 shows that 70% of those students who remained in the General College and 67% of those who transferred were correctly classified, with an overall hit-rate of 68.5%. There are two points to be made here. Although not perfect, these results represent an ability to classify students that is significantly beyond chance. They suggest that the difference between students who transfer and students who continue in GC after two years can be detected as early as the second quarter. And they suggest that these differences persist.

To further illustrate the last point, the final discriminant analysis was performed using students' cumulative GPAs and credits completed from their last quarter in GC along with pre-entry characteristics. For students who continued in GC, this represents their last quarter of enrollment. For those who transferred, the academic variables are based on their last quarter of enrollment prior to transfer. The best hit-rate was obtained for a single function which was dominated by last-quarter cumulative GPA and included

last-quarter cumulative credits (canonical correlation = .501). The results are presented in Table 12. Seventy-seven percent of those who remained in GC and 74% of those who transferred were correctly classified, with an overall hit-rate of 76.0%. These hit-rates suggest that the two groups are clearly distinct with respect to their academic performance in GC.

3. Retention Patterns and Academic Performance in General College

We learned from the previous analysis that the ability to discriminate among the retention pattern groups increased as college performance information was included in the set of discriminating variables. Cumulative GPA was always the most informative for classifying students into the retention pattern categories; credits completed contributed to correct placement in some cases, but generally to a very small extent. Given this relationship between GPA and retention pattern, further analyses were performed to illuminate this relationship. Four GPA categories were thus defined:

1. Cumulative GPA less than 2.00
2. Cumulative GPA between 2.00 and 2.49
3. Cumulative GPA between 2.50 and 2.99
4. Cumulative GPA of 3.00 or greater

The above definitions were applied to students' cumulative GPAs for their first, second, and last quarters in General College. For drop-outs, their last quarter in the GC is their last quarter of enrollment. For students who enrolled in GC in 1988-89, the last quarter reflects course performance through the fall of 1988. For transfer students, their last quarter in GC refers to course performance through the last quarter of enrollment prior to transfer.

Table 13 presents cross-tabulations between the four retention patterns and the GPA categories for students' first quarter in General College (i.e., fall, 1986). In each cell of the table, the number in the upper left-hand corner is the *number* of students who fell into that cross category. The number in the center of each cell represents the

percentage of students from that *row* represented by the cell, while the number in the lower right-hand corner represents *percentage* of students from that *column*.

There is a definite pattern in GPAs across the four retention groups. A high percentage of students from Patterns 1 and 2 fell into the lowest GPA category, while virtually none of the transfer students (Pattern 5) did so. The majority of Pattern 1 and 2 students had first-quarter GPAs of less then 2.50, whereas almost 90% of the transfer students had GPAs above 2.50. It appears that even after one quarter of college there is some ability to distinguish between drop-outs and students who persist and transfer. Note, however, that it is nearly impossible to identify students who either dropped out after 1987-88 or who continued to enroll in the College after two years, on the basis of GPA. Pattern 3 had nearly equal number of students with first-quarter GPAs above and below 2.50, while Pattern 4 students were evenly distributed across all four GPA categories.

Table 14 applies the same GPA categories to students' cumulative GPAs after two quarters in GC. (Pattern 1 students don't appear in Table 14 because they did not go beyond the first quarter.) The superior academic performance of transfers to drop-outs seen in Table 13 is again present, with 73% of the 1986-87 drop-outs obtaining cumulative GPAs of less than 2.50 compared to only 19% of the transfer students. Pattern 3 and 4 students' cumulative GPAs drifted towards the lower GPA categories. Sixty-three percent of the 1987-88 drop-outs and 58% of those who returned to GC had second-quarter GPAs below 2.50, with smaller representations in the 3.00 and greater categories (14% and 16%, respectively) when compared to first-quarter GPAs.

Table 15 presents a cross-tabulation between retention and last quarter in GC GPA patterns. Table 15 presents what is probably the best picture of GPAs across the five retention patterns. Dropping out right after the first quarter can be attributed to low academic performance for the majority of Pattern 1 students. However, because 32% of Pattern 1 students had first-quarter GPAs of 2.50 or greater, we must assume that other factors came into play. The story

is a little different for students who dropped out after either one or two years. Nearly all Pattern 2 and 3 students (82%) had GPAs less than 2.50; their attrition seems most clearly due to academic difficulty.

This is not to say that poor academic performance in General College caught up with 1986 students quickly. To illustrate, there was a striking contrast in GPA between the transfer and non-transfer students enrolled in 1988-89. Of the students who transferred, 73% had cumulative GPAs in GC of 2.50 or better and only one had a cumulative GPA less than 2.00. This is not surprising, given the minimum GPA requirements set by receiving colleges. What is curious is the large number of non-transfers (Pattern 4 students) with below-par cumulative GPAs. Approximately 34% of Pattern 4 students had cumulative GPAs less than 2.00 going into fall, 1988, and 74% had cumulative GPAs less than 2.50. One would expect that students enrolling in their third year would have healthier GPAs.

At first we thought that these persisters with low GPAs might be part-time attenders or intermittent stop-outs who were enrolling because of lack of transferable credits. Such a situation might provide some justification for the 34% who had GPAs of less than 2.00. We therefore cross-tabulated number of credits completed by cumulative GPA for students who continued in GC in 1988-89 (see Table 16). When the percentages are cumulated, one finds that 84% of those remaining in the General College had over 40 cumulative credits, and 63% had over 60 cumulative credits. With respect to remaining students who had cumulative GPAs of less than 2.50, 82% had more than 40 cumulative credits and 57% had more than 60 cumulative credits. Although not all General College credits transfer, most of the students in the below 2.50 range had enough credits to provide a fair representation of their academic performance. These data suggest that a large number of students from the 1986 cohort who remained in GC after two years did so even though they had a low likelihood of transfer.

Of the 84 students who continued to enroll in GC in good standing (i.e., cumulative GPAs of 2.50 or greater), most appeared to have enough credits to transfer. Almost 90% of these students had

more than 40 cumulative credits and 80% had more than 60 cumulative credits. It may be that many of these students did transfer to another unit in the spring of 1989. Such information is not available at present, but should be by the early summer. We will take another look at these students next year as well as the fall, 1987 and fall, 1988 cohorts, the latter of which represents the first year of the Base Curriculum.

Conclusions

Is transfer rate an appropriate criterion for evaluating the transfer mission of two-year colleges? What does the indicator indicate? What does it fail to convey? If transfer rate is an important indicator for General College, how "good" is the transfer rate of the 1986 cohort? Can we expect it to increase or decrease with the advent of the Base Curriculum?

While we leave these questions to the General College community to debate, this report concludes with some summary comments to consider:

1. While published data on transfer are spotty, not entirely reliable, difficult to summarize, and hazardous in terms of direct comparison, they do suggest that two-year programs have tended to transfer fewer than half, and in many cases fewer than a third, of their full-time students. Somewhere around 5-10% of total institutional enrollment annually, and 20-40% of each class after two-to-four years are very rough estimates of what has been witnessed in previous decades. The data also indicate that fewer students are transferring today, and at lower rates, than twenty years ago, although the declines seem to have leveled out.

2. The data suggest that transfer rates are affected by multiple sources including student characteristics, organizational determinants, and societal influences. The two-year program does have control over some of these "external" factors, however, in

such things as admissions procedures, student assessment, curriculum, advising, student and transfer "linkages," and exit counseling. It also has very direct control over how the transfer rate is calculated locally, for whom, after what period or amount of time, and to what combination of receiving institutions.

3. The literature suggests that for a two-year college within a four-year institution (such as GC), certain factors would work towards a high transfer rate and certain factors might work against it. The close physical proximinity of GC, for example, to its receiving colleges, the opportunity for well-articulated curricula and well-coordinated advising, the clear transfer mission, and the unambiguous emphasis on transfer during admissions are all conditions that favor high transfer rates.

   At the same time, transfer rates are highest when two-year colleges can counsel their students to a variety of receiving schools, according to their abilities and interests. Transfer rates are generally lower to research universities than they are to comprehensive universities or to state colleges, although being close to a "large public university" was considered an advantage (Lombardi, 1979). Most likely, transfer rates to research-oriented universities are low because of two primary factors: 1) the significant discrepency between entering freshmen in two- and four-year programs in terms of skills, preparation, abilities, and perhaps attitudes, and 2) rigorous admissions and graduation requirements of the senior college. Rates are also lower, generally speaking, for students transferring from public rather than private two-year colleges.

4. Based on the literature, one might say that the GC 1986 cohort's transfer rate of approximately 22% after two-plus years (eight quarters) is pretty much on target. If transfers outside the University were included, the rate would be somewhat higher. If this cohort were to be followed up again in the next year or two, it's conceivable that the transfer rate would rise; much of the literature indicates that it takes nontraditional students longer

than two years to transfer. From the analysis of our 1986 data, however, it appears that the rate can't rise drastically. As Table 15 showed, of the 319 students still enrolled in GC in 1988-89, only 84 students were in strong academic standing (i.e., cum GPA 2.50 or above). One hundred twenty-five students had GPAs between 2.00 and 2.49; this is below CLA's cut-off, but some of these students may transfer (18% of all GC transfers had GPAs in this range). The remaining 110 students still enrolled had GPAs below 2.00. Still, were the 84 students in strong academic standing to transfer, GC's transfer rate would reach 30%.

5. While pre-enrollment characteristics were not useful in our investigation of the 1986 GC cohort in predicting transfer, post-enrollment characteristics (notably, cumulative GPA after two quarters) were very indicative of a student's eventual path. While these data reflect "pre-Base Curriculum" conditions, GPA will almost certainly continue to be an accurate indicator of a student's likelihood of transfer. In fact, probation and suspension policies (in addition to minimum GPA requirements of receiving colleges) will have the effect of building these performance indicators "into the system" and further guaranteeing that low GPA will coincide with low transfer potential.

6. The length of time it takes students in good standing to transfer remains an important question, one worth watching. Table 1, which showed the quarter in which students transferred, displayed a bimodal distribution; two separate "waves" of transfer occurred, and the second one is still fairly strong (although it's tapering off) in the eighth quarter. Whether these "late" transferring students were part-timers, students who had multiple noncredit courses to complete during their freshman year, or "success stories" who performed poorly during their first few quarters and progressed in subsequent quarters, is not known.

Summary. Educational evaluation has been called the science and the art of determining the merit and worth of education programs. The literature makes an important distinction between *merit* (intrinsic quality, excellence) and *worth* (need for particular service, value put upon it.) A program may have high merit and low worth. For example, a school of dentistry may be deemed excellent in terms of reputation, facilities, faculty, curriculum, student achievement and satisfaction, etc., but have low worth due to a regional surplus of dentists and declining student enrollments. When reflecting on the utility of transfer rate as an indicator, it may be relevant to ask, "Does transfer rate reflect a program's merit, or does it relate more to its worth?"

As long as an open admissions policy remains in effect in General College, transfer rate per se would seem to be a poor indicator of its merit. Recall that three assumptions are made in using an indicator for evaluation: that figures are reliable; that results can be interpreted in light of standards, comparative data, or previous data; and that extraneous influences on the indicator can be controlled. While reliable transfer data can be compiled within GC over time, the reference points (i.e., national averages or standards) needed to interpret our rates remain vague ("Just how many students are we supposed to transfer to be 'good'?"). Additionally, the indicator is affected by too many extraneous variables to attach summative judgment to the two-year college alone. By itself, the rate tells us little about the construction or rigor of the curriculum, the comprehensive advising strategies and other institutional efforts designed to help students. It tells us nothing about the quality of the experience from the student's perspective. It tells us nothing about additional, valuable outcomes of the time spent in college. In order for us to assess these aspects of quality, data on additional criteria need to be gathered and examined.

Transfer rates are likely to have considerable meaning, however, in terms of assessing worth of the enterprise. They communicate information pertinent to questions concerning the costs and benefits (to the University and to the taxpayers) of providing a General College. While transfer should not be the only indicator of

worth looked at, it promises to be a key one. In addition, were College admission policies to change, and selection of students on the basis of their transfer potential to become an explicit institutional goal, then transfer rate would be a very direct measure of how well this goal had been achieved. Rates alone would, again, not tell us very much about the merits of the curriculum or advising components, but they would reflect the College's overall success in identifying, preparing, and transferring students with baccalaureate potential. For these reasons (worth and goal achievement), transfer rates should be maximized where possible.

In terms of institutional research and evaluation, it will be important to calculate transfer rates of students who survive the first and second quarters in GC, as these students have survived the "filter" aspect of the Base Curriculum and can be presumed to have serious intentions regarding transfer. GC transfer rates should be tracked each year and studied over time in relation to curricular interventions and advising strategies. Additionally, the academic performance and graduation rates of our students post-transfer should be followed and compared with "native" CLA and other college students.

APPENDIX

Tables

References

Table 1. Number of students from the Fall, 1986 freshman cohort who transferred to a University unit outside of General College for each quarter from Fall, 1986 through Fall, 1988.

Transfer Quarter	Frequency	Percent	Cumulative Percent
F'86	3	1.3	1.3
W'87	7	3.0	4.3
S'87	11	4.8	9.1
F'87	49	21.2	30.3
W'88	32	13.9	44.2
S'88	26	11.3	55.4
F'88	58	25.1	80.5
W'89	45	19.5	100.0
	231	100.0	

Table 2. Transfer units for the Fall, 1986 transfer students.

Transfer Unit	Frequency	Percent
Management	3	1.3
Dental Hygiene	4	1.7
Education	6	2.6
IT	4	1.7
CLA	164	71.0
University College	6	2.6
Waseca Campus	2	0.9
Agriculture	3	1.3
Forestry	1	0.4
Home Economics	33	14.3
Business/Econ	2	0.9
Human Service	2	0.9
Science/Engineering	1	0.4
	231	100.0

Table 3. Overall percentage of students who transferred to another college for each ethnic group.

	Number in Group	Number Transferred	Percent Transferred
Black	82	12	15
American Indian	26	3	12
Asian American	72	26	36
Hispanic	19	5	26
International	8	2	20
Caucasian	773	170	22

Table 4. Overall percentage of students who transferred to another college by whether or not students are considered low-income.

	Number in Group	Number Transferred	Percent Transferred
Low-Income	272	72	27
Not Low-Income	547	120	22

Table 5. Overall percentage of students who transferred to another college by whether or not students are first-generation college students.

	Number in Group	Number Transferred	Percent Transferred
First-Generation	521	120	23
Not First-Generation	380	90	24

Table 6. Overall percentage of students who transferred to another college by whether or not students indicated a disability.

	Number in Group	Number Transferred	Percent Transferred
Disability	49	8	16
No Disability	855	202	24

Table 7. Two-year retention patterns for Fall, 1986 freshman cohort.

Pattern	Frequency	Percent
0. Never Complete F'86	34	3.3
1. Drop-Out After F'86	72	6.9
2. Drop-Out After 1 Year	181	17.8
3. Drop-Out After 2 Years	205	20.2
4. Continue GC 1988-89	319	31.4
5. Transfer by W'89	205	20.2
	1042	

Table 8. Summary of twelve discriminant analyses which investigated the utility of pre- and post-enrollment variables to predict retention patterns of students from the Fall, 1986 General College cohort.

Retention Patterns Predicted	Predictor Variables Selected	Correlations*	Classified
1. Dropped After 1 Year, Dropped After 2 Years, Continued GC, Transferred	HS GPA, family size, first-generation residence	.223, .164 .108	34.0
2. Dropped W/In 2 Years, Continued GC, Transferred	HS GPA, family size, first-generation, residence	.202, .162	42.1
3. Dropped Out, Persisted	HS GPA, first-generation, family size	.193	57.1
4. Last in GC, Transferred	HS GPA, residence	.192	60.3
5. Dropped After 1 Year, Dropped After 2 Years, Continued GC, Transferred	1st-quarter GPA, 1st-quarter credits, HS GPA	.351, .128, .055	38.4
6. Dropped Out W'87-S-88, Continued GC, Transferred	1st-quarter GPA, 1st-quarter credits, HS GPA	.392, .101	47.3
7. Dropped Out W'87-S-88, Persisted	1st-quarter GPA, first-generation, family income	.330	62.2
8. Dropped After 2 years, Continued GC, Transferred	2nd-quarter GPA, disability, first-generation, 2nd-quarter cum credits, residence, income	.467, .165	46.2
9. Last in GC F'87-W'89, Transferred	2nd-quarter GPA, 2nd-quarter cum credits, family size, residence, gender	.406	70.1
10. Last in GC F'87-W'89, Transferred	2nd-quarter GPA, 2nd-quarter cum credits	.398	69.0
11. Continued GC, Transferred	2nd-quarter GPA, 2nd-quarter cum credits	.456	68.5
12. Continued GC, Transferred	last-quarter GC GPA, last-quarter GC cum credits	.501	76.0

* A canonical correlation is reported for each function defined by the discriminant analysis. Order is from highest to lowest percent of explained variance.

Table 9. Discriminant analysis for two groups of students enrolled after Fall, 1986 (Last Enrolled General College and Transfer) with second quarter GPA, second quarter credits, family size, college residence, and gender as predictor variables.*

Actual Group	Number of Cases	Predicted Group Membership: Last in GC	Transfer
Last in GC F'87 to W'89	524	71%	29%
Transfer by W'89	192	31%	69%

Table 10. Discriminant analysis for two groups of students enrolled after Fall, 1986 (Last Enrolled General College and Transfer) with second quarter GPA and second quarter credits as predictor variables.*

Actual Group	Number of Cases	Predicted Group Membership: Last in GC	Transfer
Last in GC F'87 to W'89	524	70%	30%
Transfer by W'89	192	34%	66%

Table 11. Discriminant analysis for two groups of students enrolled after Fall, 1986 (Remain in GC and Transfer) with second quarter GPA and second quarter credits as predictor variables.*

Actual Group	Number of Cases	Predicted Group Membership: Continue GC	Transfer
Continue GC 1988-89	308	70%	30%
Transfer by W'89	188	33%	67%

* In Tables 9, 10, and 11 the percentages are of row totals, or the actual number of students in a particular group. Values in boxes indicate percent of actual group correctly classified.

Table 12. Discriminant analysis for two groups of students enrolled after Spring, 1988 (Remain in GC and Transfer) with cumulative GPA and cumulative credits for last quarter in the General College as predictor variables.*

Actual Group	Number of Cases	Predicted Group Membership: Continue GC	Transfer
Continue GC 1988-89	319	77%	23%
Transfer by W'89	205	26%	74%

* In Tables 12 the percentages are of row totals, or the actual number of students in a particular group. Values in boxes indicate percent of actual group correctly classified.

Table 13. Cross-tabulation of retention patterns by first-quarter GPA categories.*

PATTERN	Less than 2.00	Between 2.00 and 2.49	Between 2.50 and 2.99	3.00 or More	ROW TOTAL PERCENT
Pattern 1 Dropped Out After F'86	41 56.9 16.3	8 11.1 4.3	5 6.9 2.3	18 25.0 6.0	72 7.5
Pattern 2 Dropped Out After 1 Year	78 44.1 31.1	36 20.3 19.6	19 10.7 8.6	44 24.9 14.6	177 18.5
Pattern 3 Dropped Out After 2 Years	61 30.0 24.3	39 19.2 21.2	61 30.0 27.5	42 20.7 13.9	203 21.2
Pattern 4 Continue in GC 1988-89	69 22.0 27.5	77 24.6 41.8	88 28.1 39.6	79 25.2 26.2	313 32.6
Pattern 5 Transfer by W'89	2 1.0 0.8	24 12.4 13.0	49 25.3 22.1	119 61.3 39.4	194 20.2
COLUMN TOTAL PERCENT	251 26.2	184 19.2	222 23.1	302 31.5	959 100.0

* For each cell, the value in the upper left corner is the cell frequency, the center value represents percent of the row total, and the value in the lower right corner represents percent of the column total.

Table 14. Cross-tabulation of retention patterns by second-quarter cumulative GPA categories.*

PATTERN	Less Than 2.00	Between 2.00 and 2.49	Between 2.50 and 2.99	3.00 or More	ROW TOTAL PERCENT
Pattern 2 Dropped Out After 1 Year	74 50.0 33.2	34 23.0 15.0	24 16.2 11.8	16 10.8 8.3	148 17.5
Pattern 3 Dropped Out After 2 Years	68 33.8 30.5	58 28.9 25.7	47 23.4 23.2	28 13.9 14.5	201 23.8
Pattern 4 Continue in GC 1988-89	80 26.0 35.9	99 32.1 43.8	80 26.0 39.4	49 15.9 25.4	308 36.4
Pattern 5 Transfer by W'89	1 0.5 0.4	35 18.6 15.5	52 27.7 25.6	100 53.2 51.8	188 22.2
COLUMN TOTAL PERCENT	223 26.4	226 26.7	203 24.0	193 22.8	845 100.0

* For each cell, the value in the upper left corner is the cell frequency, the center value represents percent of the row total, and the value in the lower right corner represents percent of the column total.

Table 15. Cross-tabulation of retention patterns by last-quarter General College cumulative GPA categories.*

PATTERN	Less Than 2.00	Between 2.00 and 2.49	Between 2.50 and 2.99	3.00 or More	ROW TOTAL PERCENT
Pattern 1 Dropped Out After F'86	41 56.9 11.3	8 11.1 2.8	5 6.9 2.6	18 25.0 13.4	72 7.4
Pattern 2 Dropped Out After 1 Year	101 56.7 27.7	45 25.3 15.6	49 10.7 10.0	13 7.3 9.7	178 18.2
Pattern 3 Dropped Out After 2 Years	111 54.1 30.5	58 28.3 20.1	25 12.2 13.2	11 5.4 8.2	205 21.0
Pattern 4 Continue in GC 1988-89	110 34.5 30.2	125 39.2 43.3	61 19.1 32.1	23 7.2 17.2	319 32.7
Pattern 5 Transfer by W'89	1 0.5 0.3	53 26.1 18.3	80 39.4 42.1	69 34.0 51.5	203 20.8
COLUMN TOTAL PERCENT	364 37.3	289 29.6	190 19.4	134 13.7	977 100.0

* For each cell, the value in the upper left corner is the cell frequency, the center value represents percent of the row total, and the value in the lower right corner represents percent of the column total.

Table 16. Cross-tabulation of cumulative credits by cumulative GPA for students in the Fall, 1986 cohort enrolled in General College in Fall, 1988.*

Cumulative Credits	GPA		ROW TOTAL PERCENT
	Less than 2.50	2.50 or More	
0 to 10	7 3.0	1 1.2	8 2.5
11 to 20	5 2.1	1 1.2	6 1.9
21 to 30	14 6.0	5 6.0	19 6.0
31 to 40	15 6.4	2 2.4	17 5.3
41 to 50	26 11.1	2 2.4	28 8.8
51 to 60	33 14.0	6 7.1	39 12.2
61 to 70	44 18.7	11 13.1	55 17.2
71 to 80	52 22.1	25 29.8	77 24.1
81 to 90	31 13.2	23 27.4	54 16.9
91 to 100	7 3.0	6 7.1	13 4.1
Greater than 100	1 0.4	2 2.4	3 0.9
COLUMN TOTAL PERCENT	235 73.7	84 26.3	319 100.0

* For each cell, the value in the upper left hand corner represents the cell frequency and the value in the lower right hand corner represents percent of the column total.

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